WHAT IS CLAIMED IS:

1. A bit rate control method comprising:

(a) performing initialization in which a video frame is inputted and a memory is allocated to a rate distortion buffer where an encoded bitstream to be transmitted to a decoder is stored;

(b) intra-coding the inputted video frame;

(c) updating the rate distortion buffer;

(d) performing post-frame skip in which whether or not a next video frame should be encoded is determined to avoid underflow or overflow of the rate distortion buffer;

(e) receiving the next video frame, and estimating a quantization parameter if the received video frame is not a first video object plane, and inter-coding the received video frame if the received video frame is a first video object plane;

(f) performing one of a back propagation model update and a self-organizing control based on the number of the inputted video frames after inter-coding the next video frame, and then performing the post-frame skip again; and

(g) receiving the next video frame and estimating quantization parameters of all the video frames or performing the self-organizing control in all the video frames.

2. The method of claim 1, wherein step (e) comprises:

(e1) receiving the next video frame;

(e2) determining whether or not the received video frame is a first video object plane;

(e3) if it is determined that the received video frame is the first video object plane, performing inter-coding; and

(e4) if it is determined that the received video frame is not the first video object plane, performing target estimation for estimating a number of bits to be allocated to the received video frame according to a state of the rate distortion buffer, performing joint buffer control for modifying the rate distortion buffer in consideration of a structure of the network and the target estimation result, and estimating a quantization parameter based on the result.

3. The method of claim 2, wherein estimating the quantization parameter in step (e4) comprises:

(e4a) positioning an input vector at an input layer;

(e4b) obtaining a prediction output from the network organized by the self-organizing control;

(e4c) predicting a quantization parameter from the prediction output such that an error remains within a predetermined range; and

(e4d) allocating the predicted quantization parameter to a quantizer.

4. The method of claim 3, wherein step (e4c) comprises:

(e4c1) selecting the quantization parameter such that a quantization parameter difference between adjacent frames is limited to less than ± 2; and

(e4c2) finding an appropriate quantization parameter that is the closest to the prediction output.

5. The method of claim 1, wherein step (f) comprises:

(f1) determining whether or not the number of inputted video frames is less than a pre-set constant;

(f2) if it is determined that the number of the inputted video frames is less than the pre-set constant, performing the self-organizing control for organizing a network and updating the rate distortion buffer; and

(f3) if it is determined that the number of the inputted video frames is equal to or more than the pre-set constant, performing the back propagation model update.

6. A bit rate control apparatus comprising:

a pre-encoding unit for receiving a video stream and initializing a buffer required for coding;

an encoding unit for inter-coding and intra-coding the received video stream;

a post-encoding unit for updating the buffer based on the coded video data and adjusting a bit rate by controlling frame-skip;

a time instant update unit for receiving a next frame; and

a determination unit for determining whether or not the received frame is a first video object plane.

7. The apparatus of claim 6, wherein the pre-encoding unit comprises:

an initialization unit for allocating a memory to a rate distortion buffer in which an encoded bitstream to be transmitted to a decoder is stored;

a quantization parameter estimation unit for estimating a quantization parameter for encoding, using a predetermined organized network;

a target estimation unit for estimating an amount of bits to be allocated to an inputted frame according to a state of the rate distortion buffer; and

a joint buffer control unit for modifying the rate distortion buffer in consideration of the structure of the network and the target estimation result.

8. The apparatus of claim 6, wherein the post-encoding unit comprises:

a rate distortion update unit for updating the rate distortion buffer in which an encoded bitstream to be transmitted to the decoder is stored;

a back propagation update control unit for performing back propagation model update control;

a self-organizing control unit for organizing a network and updating the rate distortion buffer based on the coding result; and

a post-frame skip control unit for determining whether or not the next frame is encoded to avoid underflow or overflow of the rate distortion buffer based on the encoded bitstream.

9. A computer-readable medium having embodied thereon a computer program for executing a bit rate control method comprising:

(a) performing initialization in which a video frame is inputted and a memory is allocated to a rate distortion buffer where an encoded bitstream to be transmitted to a decoder is stored;

(b) intra-coding the inputted video frame;

(c) updating the rate distortion buffer;

(d) performing post-frame skip in which whether or not a next video frame should be encoded is determined to avoid underflow or overflow of the rate distortion buffer;

(e) receiving the next video frame, and estimating a quantization parameter if the received video frame is not a first video object plane, and inter-coding the received video frame if the received video frame is a first video object plane;

(f) performing one of a back propagation model update and a self-organizing control based on the number of the inputted video frames after inter-coding the next video frame, and then performing the post-frame skip again; and

(g) receiving the next video frame and estimating quantization parameters of all the video frames or performing the self-organizing control in all the video frames.

10. The computer-readable medium of claim 9, wherein step (e) comprises:

(e1) receiving the next video frame;

(e2) determining whether or not the received video frame is a first video object plane;

(e3) if it is determined that the received video frame is the first video object plane, performing inter-coding; and

(e4) if it is determined that the received video frame is not the first video object plane, performing target estimation for estimating a number of bits to be allocated to the received video frame according to a state of the rate distortion buffer, performing joint buffer control for modifying the rate distortion buffer in consideration of a structure of the network and the target estimation result, and estimating a quantization parameter based on the result.

11. The computer-readable medium of claim 10, wherein estimating the quantization parameter in step (e4) comprises:

(e4a) positioning an input vector at an input layer;

(e4b) obtaining a prediction output from the network organized by the self-organizing control;

(e4c) predicting a quantization parameter from the prediction output such that an error remains within a predetermined range; and

(e4d) allocating the predicted quantization parameter to a quantizer.

12. The computer-readable medium of claim 11, wherein step (e4c) comprises:

(e4c1) selecting the quantization parameter such that a quantization parameter difference between adjacent frames is limited to less than ± 2; and

(e4c2) finding an appropriate quantization parameter that is the closest to the prediction output.

13. The computer-readable medium of claim 9, wherein step (f) comprises:

(f1) determining whether or not the number of inputted video frames is less than a pre-set constant;

(f2) if it is determined that the number of the inputted video frames is less than the pre-set constant, performing the self-organizing control for organizing a network and updating the rate distortion buffer; and

(f3) if it is determined that the number of the inputted video frames is equal to or more than the pre-set constant, performing the back propagation model update.